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Environmental Humanities and Sustainable Development: Reimagining Human-Nature Relations in the Anthropocene

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ABSTRACT

In recent years, with climate change, the loss of biodiversity, the intensification of desertification and the increasing frequency of extreme weather events, environmental issues are no longer confined to the realm of natural science research; they now encompass a comprehensive range of historical, cultural, ethical, social, economic and political concerns. The emergence of the Environmental Humanities has provided a new interdisciplinary perspective from which to reinterpret the environmental crisis. This paper examines the historical evolution of the relationship between humans and nature and concludes that, whilst people have traditionally relied on natural resources to sustain their livelihoods, the advent of modern civilisation—with coal, steam power and, subsequently, oil, electricity and modern industrial technology—has freed them from the direct constraints of organic energy sources. With the emergence of the energy crisis, the concept of sustainable development has attracted widespread attention within the academic community.

Keywords: *Environmental Humanities, Anthropocene, Sustainable Development, Energy Crisis, Pakistan.*

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Introduction

Over the past century, climate change has been reshaping global resource systems, placing unprecedented pressure on the coupled dynamics of water, food and energy. These climate-induced cascading effects have had a disproportionate impact on regions with weak governance and limited adaptive capacity. The global climate has been steadily warming; this warming intensifies global water cycle processes, leading to changes in precipitation distribution patterns. Climate change not only causes severe economic losses but, in conjunction with human activities, also has a

serious impact on ecosystems. Species diversity and community diversity form the foundation for maintaining the diversity and stability of ecological landscapes. Warming has a significant impact on the water and heat dynamics of ecosystems, leading to marked changes in species composition and community structure. Over the course of the long evolutionary history of species, genes and climate have formed a stable interactive relationship. Climate change inevitably leads to alterations in genetic material, which in turn causes changes in genetic diversity. Temperature is a key factor influencing plant growth and development.



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Rising temperatures have a certain impact on the growth and reproductive traits of species and populations across different vegetation types. On a global scale, global warming enhances the functional traits and diversity levels of plants. Climate change affects biodiversity which have an impact on individuals, populations, species, ecological networks, and ecosystems and are expressed at various levels. Because of directional selection and fast migration, climate change can reduce population genetic diversity at the most fundamental level of biodiversity, which may have an impact on ecosystem resilience and functioning (Botkin et al, 2007). However, the majority of research focuses on effects at higher organisational levels, and only a limited number of species have had their genetic responses to climate change examined. Beyond this, the "web of interactions" at the community level is probably going to change due to the different effects on populations (Gilman 2010; Walther 2010). Essentially, some species' reactions to climate change may have an indirect effect on the species that rely on them. According to a research of 9650 interspecific systems, such as parasites and pollinators, over 6300 species could go extinct after their related species do (Koh et al., 2004). Forests are among the most important regulators of regional and global climate, and are the most significant natural carbon sinks and reservoirs of terrestrial biomass. They are of inestimable value to biodiversity, ecosystem services, social and cultural identity, livelihoods, and climate change adaptation and mitigation. Between 1990 and 2020, more than 420 million hectares of forest were lost to deforestation; over 90 per cent of this loss occurred in tropical regions (high confidence), threatening biodiversity, environmental services, the livelihoods of forest communities and their ability to cope with climate shocks (high confidence) (IPCC Sixth Assessment Report). The use of water resources is one of the most striking manifestations of the interdependence between humans and nature; nearly 80 per cent of the world's population faces a high risk to water security (CJ Vörösmarty et al., 2010). Water security also poses significant challenges to riverine species around the world. It is essential to strike a creative balance between ensuring water security for human use and conserving biodiversity, whilst addressing the root causes rather than merely alleviating the symptoms. Sustainable solutions to these problems

must be found. Human over-exploitation of water resources may lead to water shortages in freshwater ecosystems. Excessive water abstraction and water resource regulation can cause river ecosystems to shift towards unnatural flow patterns, which may affect their water quality, biological structure and function. As the world's population continues to grow and energy demand rises, limited resources may be depleted; energy consumption, economic growth, energy imports and the depletion of natural resources all exacerbate environmental degradation. To ensure that the depletion of natural resources does not undermine economic development, Government departments, in particular, should encourage businesses to invest in sustainable practices and resources, which will yield dual benefits: reducing the consumption of natural resources whilst promoting economic growth. Furthermore, the global community must unite to strengthen legal frameworks to ensure the responsible management of natural resources, including the formulation of clear regulations on resource extraction and the imposition of penalties on companies that breach these regulations. This paper explores the question: why, despite continuous economic and technological development, is the relationship between humanity and nature becoming increasingly strained?

Literature Review

The History of the Development of Environmental Humanities

Environmental philosophy emerged as a branch of philosophy in the 1970s, followed by environmental history in the 1980s and ecocriticism in the early 1990s; in the first few decades of their existence, these sub-disciplines all struggled to gain recognition within their respective parent disciplines. In the years since the turn of the 21st century, as these fields have successively established academic posts, specialist journals, organisations and academic conferences, the importance of environmental issues to the study of philosophy, history and literature has become beyond doubt.

'Environmentally-oriented literary criticism' (ecocriticism) – initially practised by scholars of German literature in the UK and the US, as well as by scholars of American literature at German universities – has only just begun to gain a foothold in German-language literature departments in

Germany itself. In short, the Environmental Humanities is not simply a combination of 'environment' and 'humanities', but rather a reflection on the traditional relationship between the environment and humankind.

In their book 'The Environmental Humanities: A Critical Introduction' (MIT Press), Emmett & Nye argue that environmental problems cannot be solved by science and technology alone (Emmett & Nye, 2017). Castree redefines the Environmental Humanities, which encompasses a wide range of research, teaching and public engagement activities across multiple disciplines, from philosophy and anthropology to history and human geography (Castree, 2021). It also distinguishes itself from the traditional humanities, which often treat environmental issues as secondary: much like the social sciences, they tend to analyse human thought and activity in isolation from non-human factors such as climate, water resources and forests.

Theoretical Background

Grotfeldt argues that ecocriticism aims to analyse how literary works reflect the relationship between humans and the natural environment. Lawrence Buell (1996) introduced the concept of the 'environmental imagination' to explain how the imagination is influenced by the natural environment. Furthermore, ecocriticism explores how nature is represented in works of art and the constituent elements of nature writing. It seeks to reveal how human indifference towards nature undermines environmental quality. Ecocriticism analyses not only people's attitudes towards nature, but also the ways in which environmental issues and related cultural concerns are portrayed. Through literary works, it helps us to better understand the concept of humanity as an integral part of the environment. Ecocriticism opens the door to understanding the relationship between the environment and literature, demonstrating its focus on the roles that both play in society. It thereby highlights environmental issues such as global warming and the depletion of natural resources facing humanity, as well as how humans themselves degrade environmental quality through deforestation, pollution and population explosion. It emphasises the interrelationships and interdependence between the human and non-human actors that constitute the environment.

In **Nature's Economy: A History of Ecological*

*Ideas**, author Worster pioneers a journey through the intricate landscape of the history of ecological and environmental thought. The book illuminates the ambiguous relationship between ecology and environmentalism, as well as the lay public's understanding of ecology. By contrasting the everyday language of ecology with its scientific meaning, Worster highlights a rich field of study that remains to be fully explored: the intersection between scientific and popular conceptions of nature. In certain chapters, Worster skilfully integrates environmental history with the history of ideas, powerfully demonstrating the profound significance of understanding the ecological conditions of specific regions from a historical perspective (Gregg Mitman, 1995). Haraway, the author of **When Species Meet**, places duty and responsiveness at the centre of her argument. By insisting that we must recognise the necessity of responding to non-human animals, she is in fact laying the foundations for an ethical relationship with them. If we must respond to animals, then they cannot be regarded as machines (Brown, 2009). In other words, if humans are truly capable of responding to non-human animals, then non-human animals should not be treated as machines.

Environmental Humanities in China

The core concept of the book 'Chinese Environmental Humanities' is that 'Environment' is not merely the natural environment excluding humans; rather, it encompasses the shared elements of humans, animals, plants, technology, space, cities, media, culture and ecosystems. The book demonstrates the application of contemporary ecological criticism methods in the production of Chinese culture and aesthetics, and explores their practical application in China and beyond (Chang, 2019). According to Chang's understanding of the Environmental Humanities, one cannot simply import Environmental Humanities as a purely Western theory into China. In her article 'Environmental Humanities: A Shift in Western Humanities', Nan Gong Meifang argues that since the term 'environmental humanities' was formally introduced in 2012, this field has incorporated new intellectual currents such as 'posthumanism' and 'new materialism'. It first challenges the exceptionalism of humanity, deconstructs the binary opposition between the human and the non-human, and posits that humans, like all other beings, are part of the world;

secondly, that subjectivity is not exclusive to humans, and that non-human entities also possess agentic subjectivity; and finally, that only on this basis can an environmental ethics that treats humans and nature as equals truly be established (Nan Gong Meifang, 2023). This article challenges anthropocentric and even dualistic perspectives, with its central focus being environmental issues. In his article 'The Role of Environmental Humanities in Ecological Civilisation', Han Yun-jeong not only addresses the ecological crisis but also challenges the traditional dualism between humans and the environment; furthermore, he highlights the connection between Environmental Humanities and Sustainable Development, and demonstrates that Environmental Humanities are not merely theoretical but also hold practical significance (Han, 2020). Existing literature has primarily focused on the impact of economic development, scientific and technological progress, policy-making and institutional improvements on the environment, whilst neglecting a systematic discussion of the humanistic environment as it relates to cultural imaginaries, historical memory, environmental ethics, narratives of the relationship between humans and nature, and transhumanist perspectives.

Research Methods

This paper adopts a methodology combining qualitative research and interdisciplinary research, utilising the Environmental Humanities as its primary theoretical framework, alongside the methods and theories of sustainable development and the Anthropocene, to analyse the evolution of the relationship between humans and nature across different historical periods. Furthermore, this paper employs a literature review methodology, drawing primarily on English-language academic databases such as JSTOR, Google Scholar, Web of Science and Scopus, as well as Chinese academic databases including China National Knowledge Infrastructure (CNKI) and Wanfang. A historical analysis approach is utilised in examining the long-term evolution of the relationship between humans and nature. The traditional relationship between humans and nature has progressed from the use of nature, to the understanding of nature, to adaptation to nature, and finally to the protection of nature. During the Industrial Revolution, changes in the energy structure expanded humanity's capacity to

alter nature. Modern industrialisation, deforestation, the excessive waste of water resources and energy consumption have led to a series of problems, including environmental pollution, social expansion and urbanisation; the Anthropocene era, however, reveals a symbiotic relationship between humans and nature.

The Historical Transformation of Human-Nature Relations

Burks believes that traditional ecological knowledge is not a panacea, but it nevertheless holds immeasurable value (Berkes, 2008). His view can be interpreted as meaning that traditional, local or indigenous ecological knowledge is not static; on the contrary, it is constantly evolving and changing in response to social development, forming a dynamic knowledge system. Burks does not regard traditional ecological knowledge as merely traditional knowledge; rather, he views the combination of 'knowledge, practice and belief complex' as the traditional ecological knowledge system.

Traditional societies utilise natural resources through accumulated ecological knowledge—such as systems relating to hunting, fishing, agriculture, forest management, water management and resource-use rules. Through the accumulation of long-term experience, these societies do not sustain their livelihoods by depleting nature; rather, whilst using ecological knowledge to utilise natural resources rationally, they simultaneously establish corresponding management systems.

This is because traditional resources inherently possess the characteristics of adaptive management; consequently, traditional societies are able to utilise ecological knowledge to engage in activities such as resource use, ecosystem monitoring, ecological management and adaptation.

Forest managers and other forestry practitioners collaborate on biodiversity conservation across different forest ownership regimes and landscape scales, and effectively protect biodiversity by drawing upon and integrating the knowledge of others. Of course, there are also issues in the management of forest resources by traditional societies that cannot be overlooked; therefore, any knowledge integration strategy should simultaneously address the social, economic and policy constraints that hinder the continued

development and flourishing of this knowledge.

In fact, the concept of ecological conservation within traditional culture was put forward very early on in ancient China. 'Trees should be felled in season, and birds and beasts hunted in season.' Through the principles of harmony between heaven and humanity, respect for life, universal love for all things, and moderation in desires and frugality in consumption, the ecological conservation system embodied Confucian advocacy for the rational utilisation and protection of ecological resources; the approach of traditional society to the development and utilisation of nature was not equivalent to modern concepts of resource development. Traditional Chinese society utilised resources in a timely, measured and moderate manner through seasonal gathering, crop rotation, taboos, land fallow periods and rules governing resource use.

Sinthumule argues that traditional nature conservation does not rely solely on management systems, but may require the coordinated application of taboos, totems, customs, rituals, traditional protected areas, local plant knowledge, animal knowledge and resource management systems. Traditional ecological knowledge is not a relic of past social development; on the contrary, it combines with modern knowledge to contribute to the conservation of nature.

However, the ancient Chinese concept of 'harmony between Heaven and humankind' is not equivalent to the modern ecological concept. Consequently, there remains considerable scope for further exploration in this field, and scholars need to build upon existing research to clarify the original meaning and contemporary significance of 'harmony between Heaven and humankind'.

The role of traditional ecological knowledge in monitoring, responding to and managing ecosystem processes and functions is reflected in a wide variety of local or traditional ecosystem management practices. These practices include multi-species management, resource rotation, succession management, landscape patchwork management, and other methods for responding to and managing sudden ecological events. The social mechanisms underpinning these traditional practices include: a series of adaptive measures for the generation, accumulation and transmission of knowledge; the utilisation of local institutions to

provide leaders/managers and social regulations; mechanisms for the cultural internalisation of traditional practices; and the development of corresponding worldviews and cultural values. Some traditional knowledge and management systems are characterised by the use of local ecological knowledge to interpret and respond to feedback from the environment, thereby guiding the direction of resource management. These traditional systems share similarities with adaptive management in certain respects; for example, both emphasise learning from feedback and both address the uncertainty and unpredictability inherent in all ecosystems (Berkers, 2000). Social environmental identity is fostered through traditional, land-based learning. This form of learning does not simply involve the transmission of universally applicable environmental knowledge or content, but centres on life experiences, practical activities, and the shared construction of meaning and knowledge. In such settings, elders are held in high regard as honoured guests who pass on their knowledge and experience to the younger generation; learning takes place both indoors and outdoors, providing opportunities for intergenerational exploration and understanding of the natural environment (Nesterova & Jackson, 2018). Traditional ecological knowledge is not simply knowledge about the environment; it is a process that encompasses life experience, understanding of nature, adaptation to the environment, and intergenerational transmission.

Industrialization and the Transformation of Nature

The UK's abundant and inexpensive supply of coal gave rise to an energy landscape unique in the world. This situation, combined with the UK's high wage structure, created the conditions for innovation aimed at replacing expensive labour with relatively cheap fuel. The key role played by the UK's high-wage economy in driving the demand for processes that substitute energy and capital for labour (Allen, 2009). In other words, the British Industrial Revolution was not driven solely by technological innovation; it was founded on high wages, cheap coal and favourable economic conditions. The early development of the British coal industry meant that the country possessed the cheapest energy in the world, and this cheap energy in turn became a driving force for technological

innovation, ultimately transforming the relationship between humankind and nature. In 'The Industrial Revolution and Energy', Wrigley summarises that in pre-industrial societies, humankind relied primarily on: wood, crops, animals, human labour, wind and water. Following the Industrial Revolution, the large-scale use of coal and steam engines for mechanised production in Britain enabled industrial energy to increase productive capacity, breaking through the constraints of land and biomass and promoting sustained economic growth. This reveals the most fundamental characteristic of the Industrial Revolution: 'the escape from the constraints of an organic economy'. From that point onwards, humanity broke free from the limitations of traditional ecosystem-based energy sources on a large scale, shifting from a reliance on organic ecological energy sources such as wood, crops, animals and human labour to coal, steam and mineral resources. The rise of a fossil-fuel-driven civilisation. Modern civilisation has driven society towards industrialisation, agricultural modernisation, economic growth in transport, and urbanisation by extracting energy stored underground; at the same time, it has caused immense environmental damage. For instance, modern civilisation—which relies on the extraction of vast energy reserves—particularly in the fields of modern agriculture, transport, and information and communications technology, has seen a rise in the consumption of fossil fuels and electricity. Yet these finite energy reserves pose a crisis for human society.

Rethinking Sustainable Development

Development is defined as 'a process of evolution in which human capabilities are continually enhanced, including the ability to establish new structures, address problems, adapt to ongoing change, and strive purposefully and creatively to achieve new goals' (Peet, 1999). Sustainability refers to the ability of an entity, outcome or process to be maintained over a period of time (Basiago, 1999). Most scholars, researchers and practitioners use this concept to refer to economic, ecological and social systems that improve and maintain health, with a view to promoting human development. Brundtland Report poits out "Development that meets the needs of the present without compromising the ability of future generations to meet their own needs (Brundtland

Report, 1987)." This is precisely the theory of sustainable development, which is based on the principles of meeting the needs of the present without compromising the ability of future generations to meet their own needs; promoting development whilst protecting the environment; and meeting economic needs without exceeding ecological limits. The core of sustainable development lies in intergenerational and intragenerational equity, with intergenerational equity resting primarily on three interrelated yet distinct pillars: the environment, the economy and society. Key stakeholders—in particular the United Nations, national governments, the private sector and civil society organisations—need to redouble their efforts in the areas of policy, education and regulation concerning the management of social, economic and environmental resources, to ensure that everyone possesses an awareness of sustainable development, a sense of responsibility, cultural literacy and a commitment to compliance.

Conclusion

In recent years, a series of pressing issues—including climate change, the loss of biodiversity, the intensification of desertification and the frequent occurrence of extreme weather events—have posed enormous challenges to human life; the deterioration of the environment has compelled human society to alter the modes of production and lifestyle characteristic of the industrial age. Whilst issues such as environmental change, landscape transformation, toxic emissions, species extinction and climate change have traditionally fallen within the remit of the natural sciences, an increasing number of social sciences are now engaging with research in this field. Environmental issues have thus become a subject of interdisciplinary study, bringing together the natural sciences, history, culture, ethics, society, economics and politics. Environmental humanities explore humanity's role within the natural world from an interdisciplinary perspective.

This paper examines the historical evolution of the relationship between humans and nature and finds that modern civilisation is often built upon long-term adaptation to the natural environment. People have transitioned from utilising organic ecological resources such as timber, crops and animals to relying on coal, steam and mineral resources. Whilst this transition has brought economic

benefits, it has also caused environmental harm; finite energy resources will ultimately have grave and severe consequences for human life.

Consequently, sustainable models of environmental development are increasingly becoming a topic of public concern.

Conflict of Interest

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